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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/099,981	03/19/2002	Toshiaki Aoai	Q69083	5513

23373 7590 11/02/2004

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EXAMINER	
ASHTON, ROSEMARY E	

ART UNIT	PAPER NUMBER
1752	

DATE MAILED: 11/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/099,981	AOAI ET AL.
	Examiner	Art Unit
	Rosemary E. Ashton	1752

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 June 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11 and 13-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *17-23 and 31-37* is/are allowed.

6)☒ Claim(s) *1,2,4-16,24,25,27,28 and 30* is/are rejected.

7)☒ Claim(s) *3,26 and 29* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102 or 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

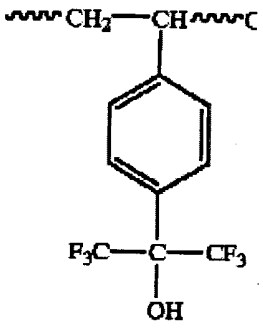
The certified translation of the priority document JP2001-079184 overcomes the Aoai reference.

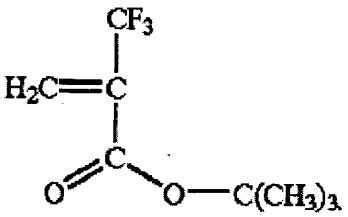
2. Claims 1,2,4-14,24,25,27,28,30 are rejected under 35 U.S.C. 102(e) as being anticipated by Allen et al U.S. patent no. 6,610,456.

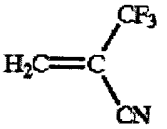
Allen teaches polymers for positive photoresist compositions comprising the polymer, a photoacid generator (PAG) and a nitrogen compound. The polymers have a monomer of 4-(hexafluoro-hydroxylisopropyl)styrene which is applicant's formula (I) when R4 is a hydrogen atom. The polymer in Example 9 has the three monomers shown below that meet the limitations of claims 1,2 and 4. The third monomer has formula (III) and the second monomer has formula IV where A2 is a single bond, R19-21 are methyl groups, R16 is a hydrogen atom and R17 is a haloalkyl (trimethylfluoro) group.

EXAMPLE 9

Terpolymer of 4-(Hexafluorohydroxyisopropyl)styrene, t-butyl 2-trifluoromethylacrylate, and .alpha.-(trifluoromethyl)acrylonitrile

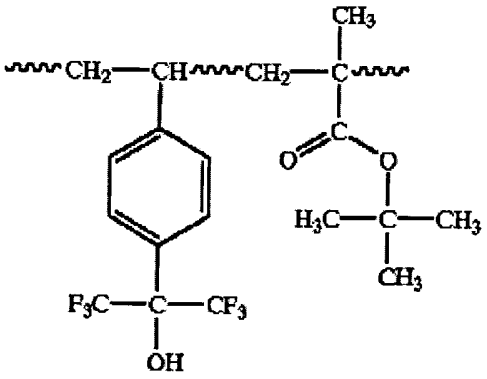






The photoresist composition comprises a nitrogen compound which acts as an acid diffusion controlling agent (col. 16, lines 35-51) as in claim 5 and an iodonium salt as a PAG which generates perfluorooctyl sulfonic acid as in claim 6 (col. 23, example 13). Other PAGs are N-camphorsulfonyl-oxynaphthalimide (an imide-N-sulfonate compound) (col. 13, lines 39-45) as in claim 7.

The polymer below has formula (I) in 10 % to 90 % which is in the range of 20-100% in claim 8 and 50 to 95 % in claim 10. The Mw of the polymer below having a trifluoromethyl acrylate, rather than a methacrylate, is 39,400 as shown in Example 7 (col. 21) as in claim 9.



The amount of PAG is 0.5-10 % by wt. as in claim 11 (col. 13, lines 60-66) and the composition may also have **a surfactant** (col. 16, lines 51-53) which one envisions to have a fluorine or silicon atoms because they are well known in the art. As shown in col. 2, lines 35-48, the composition is made for exposure at 157 nm as in claims 13 and 14.

As to new claims 24,25,27,28 and 30 Allen teaches a polymer having formula I and formula VI wherein R4 of formula I of the instant application is an alkyl group or an alkoxycarbonyl as in claim 24 (col. 8, lines 3-6). The polymer also has a cyano monomer (TFMAN) as shown in col. 9, lines 25-55.

The composition has a basic nitrogen compound as an acid diffusion control additive as in claim 27 (col. 16, lines 35-51) and a surfactant as in claims 30 (col. 16, lines 51-53). The PAG is an iodonium perfluorooctanesulfonate which generates perfluorooctane sulfonic acid as in claim 28 (23, lines 1-2).

With respect to the amendment to claim 1 and to new claim 30 which read on the positive photoresist composition comprising a fluorine or silicon containing surfactant, Allen teaches the composition may contain **an ionic or non-ionic surfactant** in col. 16, lines 51-53. While the surfactant is not specified, based on the prior art, one envisions using a fluorine or silicon containing surfactant because it is well known in the art that these specific reagents function as coating aids for the resist composition and thus do not impart novelty to the invention.

Claim Rejections - 35 USC § 103

3. Claims 15,16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Allen et al cited above.

While Allen teaches the claimed composition and exemplifies a patterning method using exposure at 248 nm it also teaches in col. 3 a method of patterning comprising coating the composition on a substrate, exposing to 248 nm or 157 nm, and developing as shown below.

> *One aspect of the invention also relates to the use of the resist composition in a lithography method. The process involves the steps of (a) coating a substrate (e.g., a ceramic, metal or semiconductor substrate) with a film comprising a radiation-sensitive acid generator and a copolymer as provided herein; (b) exposing the film selectively to a predetermined pattern of radiation to form a latent image therein; and (c) developing the image using a suitable developer composition. The radiation may be ultraviolet, electron beam or x-ray. Ultraviolet radiation is preferred, particularly deep ultraviolet radiation at 157 nm or 248 nm, or even extreme ultraviolet radiation at, for example, 13 nm. The pattern from the resist structure may then be transferred to the underlying substrate. Typically, the transfer is achieved by reactive ion etching or some other etching technique.*

Thus, while Allen does not exemplify exposure at 157 nm it would have been obvious to one of ordinary skill in the art to expose the composition taught in Allen at 157 nm with a reasonable expectation of obtaining a photoresist pattern because Allen teaches the composition is for exposure at deep UV, specifically 157 nm and 248 nm. As stated in the abstract below:

> *In a preferred embodiment, the polymers are substantially transparent to deep ultraviolet (DUV) radiation, i.e., radiation of a wavelength less than 250 nm, including 157 nm and 248 nm radiation, and are thus useful in DUV lithographic photoresist compositions.*

Allowable Subject Matter

4. Claims 3,26,29 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: Claims 3 and 26 include additional monomers in the polymer of claim 1 which are not taught in the prior art. Claim 29 is directed to a PAG not used in the composition.

5. Claims 17-23,31-37are allowed.

The following is an examiner's statement of reasons for allowance: No positive resist compositions were found having polymers with the specific monomers claimed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

6. Applicant's arguments filed June 16, 2004 have been fully considered but they are not persuasive. Applicant argues the addition of a fluorine containing or a silicon containing surfactant makes the composition of claim 1 patentable over Allen because Allen does not teach a specific surfactant. The examiner does not find this argument persuasive because it is well known in the art to

include fluorine or silicon containing surfactants in a resist composition to obtain an improved coating. Please see the abstracts of Kawabe et al, Sato et al and Mizutani et al which each teach a positive photoresist having a fluorine-containing surfactant or a silicon-containing surfactant.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rosemary E. Ashton whose telephone number is 571-272-1326. The examiner works a part-time work schedule and can normally be reached M-F between 11:30 am – 5:30 pm.

If multiple attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly can be reached at 571-272-1526.

The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov.

Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

rea
October 28, 2004

Rosemary E. Ashton
Primary Examiner
Art Unit 1752

ROSEMARY ASHTON
PRIMARY EXAMINER